



Steam Controller Teardown

Steam Controller teardown performed on November 10, 2015.

Written By: Dante Mazzanti



INTRODUCTION

Every once in a while, cloud software giant Valve tries their hand at hardware—see the [Steam Machine](#) of old. This time around they've promised to revolutionize the way we game with their Steam Controller. They've impressed us with highly modular tech in the past, so let's dig in and find out how much game this controller's got.

While you're at it, keep up with the iFixit crew by following us on [Instagram](#), [Facebook](#), and [Twitter](#).



TOOLS:

- [T6 Torx Screwdriver](#) (1)
 - [iFixit Opening Tools](#) (1)
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Step 1 — Steam Controller Teardown



- We open the *valve* and the specs come pouring out:
 - High-definition haptic feedback
 - Dual trackpads
 - USB 2.0 via Micro-USB port
 - 6-axis combination gyroscope-accelerometer sensor
 - Dual-stage digital triggers with 10° of travel, magnetic flux sensor, and tactile switch
 - Up to 80 hours of gameplay from a pair of removable AA batteries
 - 5 meters of wireless communication range

Step 2



- For comparison purposes: an Xbox One controller next to the Steam Controller.
- ❗ Both controllers share the same AB-XY button layout, but Valve's offering has a substantially larger footprint thanks to its pair of capacitive touchpads.
- The rear cover snaps off with no tools required to reveal the model number: 1001.

Step 3



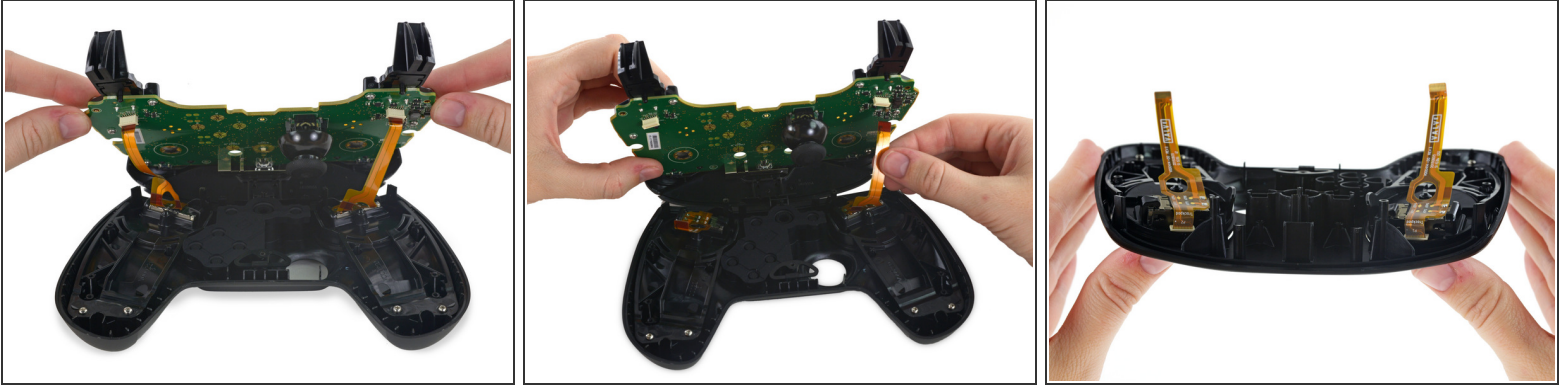
- After rooting around the battery compartment, we punch through the sticker on the back to find three T6 Torx screws.
 - With the rear housing removed, we get our first look inside the controller as the glossy black exterior gives way to the mossy green PCB interior.
- i** So far we've only used our hands and a screwdriver, but we're already in—this controller's already scoring points in our book.


Step 4



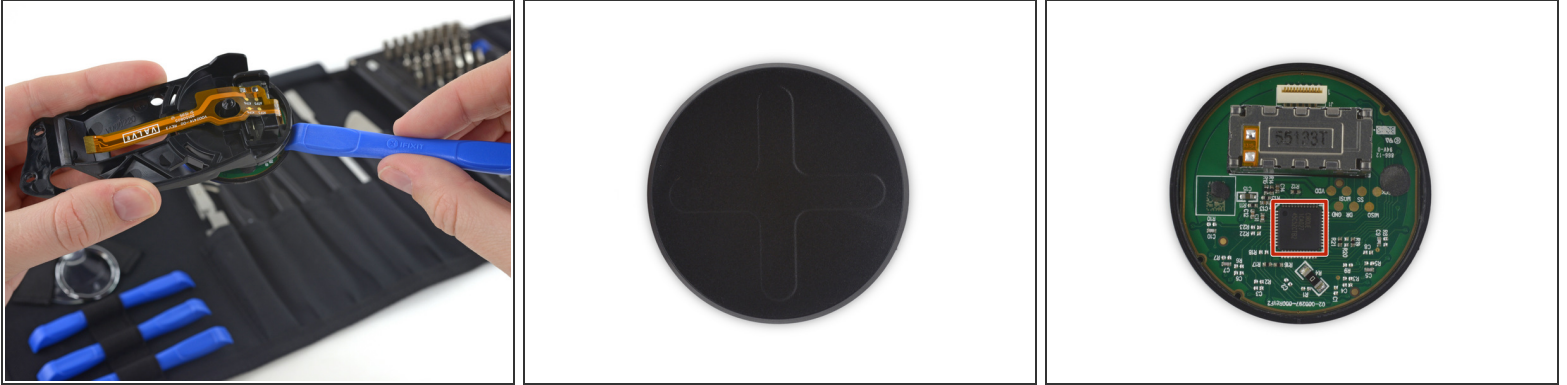
- Underneath the rear casing, we find a couple of snazzy battery eject levers—something we haven't seen in other controllers.
 - ⓘ Faster battery replacements mean less time *not* playing video games. Word.
- While battery eject levers are nice, what we're *actually* interested in is Valve's decision to abstain from using an integrated battery.
 - This design choice eliminates a commonly-failing component to extend the Steam Controller's lifetime, and gives users a choice: disposable or rechargeable batteries. The future of the planet is (literally) in your hands.

Step 5



- [It's a trap!](#) Lifting the motherboard out of its housing reveals a couple hidden ribbon cables connecting the touchpads to the underside of the board.
 Repairer beware: removing the motherboard without dispatching these cables will greatly increase your repair woes.
- We're never fans of treacherous cables like these, but this is hardly the [worst](#) we've seen.
- Moving right along, we disconnect the ribbon cables with a firm tug, freeing the upper assembly for closer inspection and giving us a glimpse at the inner workings of the touchpads.

Step 6



- We finally break out our favorite tools to bust the touchpad out from behind its bracket bars. This time, we're using a plastic opening tool from our [all-new Pro Tech Toolkit](#).
- The ribbon cable plugs into a socket on the touchpad daughterboard *and* is soldered to the haptic feedback actuators, adding some redundancy and durability to the touchpad module.
- The whole assembly is a touchpad solution from Cirque, likely the GlidePoint [TM040040](#).
 - The brains of the operation is a Cirque 1CA027 companion MCU.
- Also hiding on the daughterboard we find one of our *least* favorite things: glue. Those two black globs are mounds of adhesive, securing the touchpad to its bracket.
- ① Happily, this is the only adhesive we encountered in this device, and neutralizing it didn't get too messy.

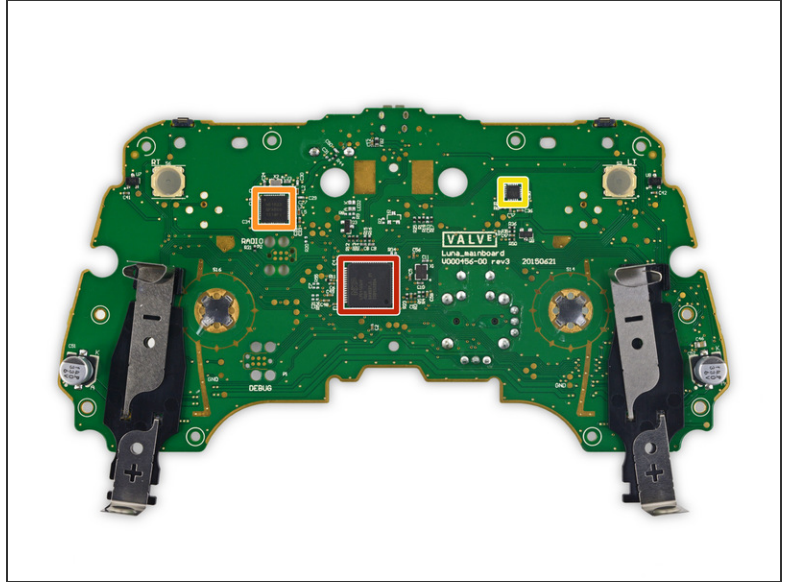
Step 7



- We deftly dispatch a few more screws and the dual-stage triggers come along for a ride.
- Much to our surprise they simply slot into the motherboard. No adhesive nor mechanical tricks here!
- The dual-stage trigger can be broken down into two stages:
 - The first is the smooth motion of the trigger when initially pressed. The magnetic flux sensor measures the position and speed of the trigger based on a time-varying flux.
 - The second part is the *click* at the end where the trigger physically presses a button on the motherboard.

✦ Boom, headshot.

Step 8

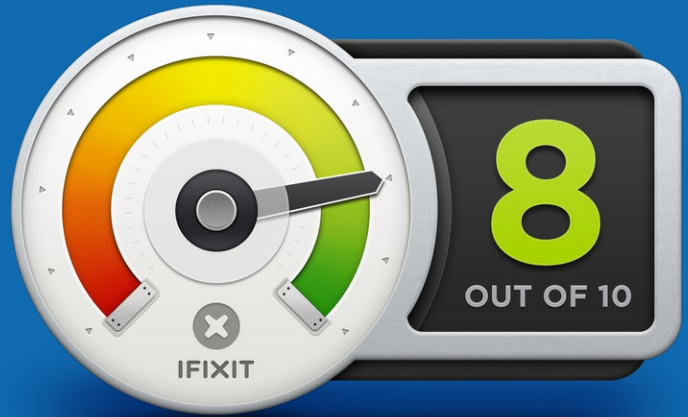


- The motherboard is a fiberglass plane home to a smattering of circuit elements. We do our due diligence and identify:
 - NXP [LPC11U37F](#) 32-bit [ARM Cortex-M0](#) microcontroller
 - Nordic Semiconductor [nRF51822](#) Bluetooth Smart and 2.4GHz proprietary SoC
 - Invensense [MPU-6500](#) Six-Axis (Gyro + Accelerometer) MEMS MotionTracking device

Step 9



REPAIRABILITY SCORE:



- Steam Controller Repairability Score: **8 out of 10** (10 is easiest to repair)
 - The only adhesive we encountered was on the touchpads. All other mechanical connections are made with screws.
 - The Controller's relatively modular construction means replacing a single component will be a simple task.
 - While we always say screws before glue, the *non-magnetic* screws used in this controller are apt to get misplaced and throw a wrench into repairs.
 - The most likely-to-fail component, the thumbstick, is soldered directly to the motherboard.

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